Integrated Financial Management Program

Administrative Systems Implementation Projects Office

Risk Management Plan

BASELINE

December 17, 2004

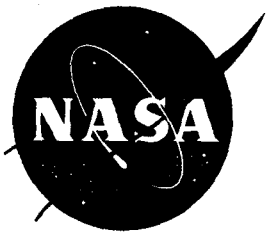

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Table of Contents

1.0 SCOPE/PURPOSE 5
1.1 Drivers 5
2.0 APPLICABLE DOCUMENTS 5
3.0 ACRONYMS 6
4.0 INTRODUCTION 6
4.1 Continuous Risk Management Overview 7
4.2 Process Overview 9
5.0 RISK MANAGEMENT PRINCIPLES 10
6.0 ROLES, RESPONSIBILITIES AND ORGANIZATION 11
7.0 RISK IDENTIFICATION 14
7.1 Tools and Techniques 15
8.0 RISK ANALYSIS 15
8.1 Risk Statement 15
8.2 Timeframe Assessment 15
8.3 Likelihood Assessment 16
8.4 Consequence Assessment 16
8.5 Risk Criticality Ranking 18
9.0 RISK HANDLING, PLANNING, TRACKING & CONTROL 19
9.1 Risk Handling Rules 19
9.2 Risk Handling Options 21
9.3 Risk Tracking & Control 21
10.0 COMMUNICATIONS & REPORTING 22
10.1 Risk Management Facilitation 22
10.2 Risk Database 23
11.0 RISK MANAGEMENT COMMITTMENT & EFFECTIVENESS 23
12.0 DESCOPE APPROACH 24

APPENDIX A: Project Organizational Charts and Signature Pages..... ..25

APPENDIX B: Risk Identification/Analysis Tools and Techniques..... ..28

APPENDIX C: Risk Detail Template..... 32

APPENDIX D: Contingency Reserves Allocation Process 35

APPENDIX E: IFM Program Risk Communicating & Reporting.....42

APPENDIX F: Performance Measures.....44

1.0 SCOPE/PURPOSE

The Risk Management Plan outlines the strategy for managing risks for the Integrated Financial Management Program (IFM Program) Administrative Systems Implementation Projects Office (ASIPO) Projects. All projects managed by the ASIPO will adhere to the ASIPO Risk Management Plan and will be referred to as the "Project" throughout the document. The Risk Management Plan outlines the standard processes and techniques for identifying, analyzing, planning, tracking, and controlling risks as well as defining the roles and responsibilities for each level of Project risk management. Continuous risk management applies to all Project staff responsible for development, implementation, and maintenance of the Project.

ASIPO's risk management policy is to continuously monitor and review the organization's risk management processes and activities to verify that they comply with the Program/Project's policy and guideline objectives. During the Project Formulation baseline risks and mitigation strategies will be developed, as well National Aeronautics and Space Administration (NASA) risk management techniques will be addressed where applicable.

The Risk Management Plan was developed within the overall guidelines of the IFM Program Risk Management Framework and NASA Procedural Requirements (NPR) 7120.5.

1.1 Drivers

The overarching goal of the IFM Program is to improve the processes to acquire and manage the financial, physical, and human resources throughout the Agency. The IFM Program will affect every NASA employee and have a significant consequence on the Agency's ability to successfully implement its strategic plans. Implementing these kinds of projects is very difficult. However, the rewards for successful implementations are substantial in terms of improving decision-making capabilities, increasing accountability, reducing inefficiencies, and leveraging the full potential of employees and business partners. In order to succeed, it is essential that the Project implements sound fundamental project management principles. A strong risk management process is key to maximizing the team's effectiveness, maintaining credibility, and ensuring the Project achieves NASA's objectives.

2.0 APPLICABLE DOCUMENTS

The following documents were used to develop this plan to ensure that the IFM Program ASIPO is compliant with NASA Quality Assurance requirements:

- NASA Procedural Requirements (NPR) 8000.4 Risk Management Procedures and Guidelines
- NASA Integrated Financial Management Program Plan
- NASA Integrated Financial Management Program Risk Framework

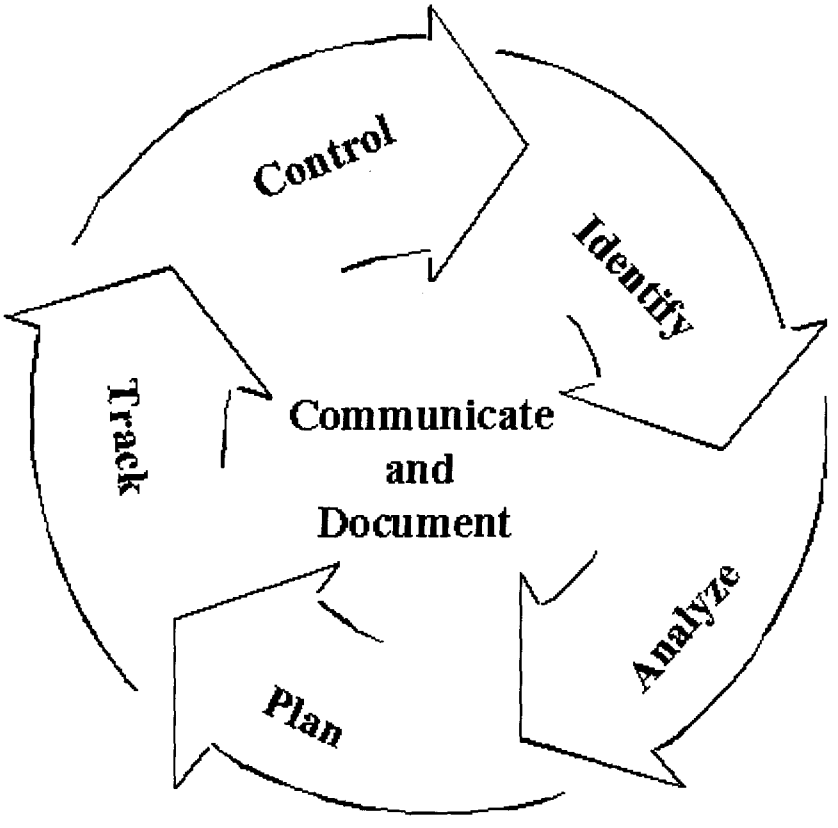
- NASA Procedural Requirements 7120.5, NASA Program and Project Management Processes and Requirements
- Software Engineering Institute (SEI) at Carnegie Mellon University, Continuous Risk Management Guidebook, 1996

3.0 ACRONYMS

ASIPO	Administrative Systems Implementation Projects Office
COTS	Commercial-off-the-shelf
EOY	End of year
FMCEA	Failure Mode, Cause and Effect
FTA	Fault Tree Analysis
IFM Program	Integrated Financial Management Program
IT	Information Technology
MDM	Methods Delivery Manager
NASA	National Aeronautics and Space Administration
NPR	NASA Procedural Requirements
PCA	Program Commitment Agreement
SEI	Software Engineering Institute

4.0 INTRODUCTION

In accordance with NPR 7120.5, NASA Program and Project Management Processes and Requirements, "Risk management planning shall begin early in formulation, shall involve the Program/Project team to assess all identifiable risks up front, shall be included in the Program Commitment Agreement (PCA)/Project/Project Plans and shall be continually reviewed for new risks and disposition and tracking of all identified risks throughout the implementation phase." The following figure represents the continuous risk management model from NPR 7120.5, which will be iterated throughout the life cycle of the Project.



Continuous Risk Management Model

The Project will incorporate the Continuous Risk Management Model, which highlights the specific methodologies to be used for risk identification, analysis, planning, tracking and controlling. The model reflects the process details and related procedures. It will also be used as a continual assessment of the Project risk profile.

4.1 Continuous Risk Management Overview

Continuous risk management is an organized, systematic decision-making process that efficiently identifies, analyzes, plans, tracks, controls, communicates and documents risk to increase the likelihood of achieving Program/Project goals. It provides a disciplined environment for proactive decision making.

Within the Project setting, a risk is defined as a situation, event, or condition potentially having a negative consequence on or otherwise endangering the IFM Program achievements in support of Agency and functional drivers, and the ASPIO Project goals and objectives within known resource, schedule, and all quality constraints. The objective of continuous risk management is to identify risks and either eliminate or mitigate their consequences in a cost-effective manner. Continuous risk management consists of performing the tasks necessary to assess, control and

communicate risks. During the development process, important unknowns critical to success will unfold as the Project proceeds; these unknowns are often risks.

The key to accommodating a risk is to recognize one cannot know everything that may happen. Anticipating potential problems as early as possible, and evaluating the potential consequences and consequences of alternative action, is a continuous requirement throughout the Project lifecycle. Carefully assessing the challenges inherent in any Project is the first step in implementing a successful Risk Management Plan.

Attributes characterizing risks include:

- Likelihood of occurrence
- Potential consequence
- Risk Criticality
- Timeframe
- Organizational source (the organization with the most influence over the risk realization and outcome)

Risk attributes play a role in determining the response to the risk. In general, the higher the likelihood of occurrence, the greater the potential consequence, or the longer the duration of the consequence, the more resources an organization is willing to allocate to respond to the risk. The response is more urgent as the start of the consequence grows closer. The longer the time between risk-realization and start of consequence, the more time available to take action after the risk is realized. When the organizational source of the risk is external, escalation and external actions are often required to respond to the risk. However, the responsibility to manage the risk remains internal.

The uncertainty associated with risks differentiates risks from issues, challenges, and problems. When a situation, event, or condition is certain to occur, the decision to allocate resources in response is relatively straightforward. When the occurrence and consequence are not certain, allocation of resources might wrongly be viewed as wasteful or as unnecessarily diverting resources from other important activities.

A continuous risk management process is planned and implemented throughout all levels of a Project. Risk management activities are documented, reviewed and reported. The IFM Program has determined that identified risks should be associated with one or more of the following four risk categories:

Cost

- Budget
- Staffing

Schedule

- Blueprinting
- Realization
- Final Preparation
- Go-Live

Integration/Technical

- System module deployment
- Integration complexities
- Information technology (IT) infrastructure
- Performance

Mission Success

- Agency business drivers and functional drivers
- Functional requirements
- Gap in system functionality versus requirements
- Successful reengineered process implementation
- Effective Change Management

4.2 Process Overview

Continuous risk management is a process designed to prevent or reduce risks and their consequences throughout the Project's lifecycle. Risk management comprises purposeful thought as to the sources, magnitude and mitigation of the Project's risks and results in actions directed at reducing those risks. The ASIPO Project risk management process addresses the key tenants of effective risk management:

- Risk management is a continuous process that occurs throughout a Project's lifecycle.
- Risk management is an integral part of the Project management decision-making at all levels.

As shown in the Continuous Risk Management Model there are five phases to the process. Each risk will go through these phases sequentially, but the activity occurs continuously, concurrently, and iteratively throughout a Project's lifecycle. The five phases are listed and briefly discussed below.

Risk Identification

The Project management will search for and locate programmatic risks before they impact the system implementation. The major areas of risk for the Project, which are inherent to any major commercial off-the-shelf (COTS) software implementation, include schedule, cost, integration/technical, and mission success. Risk identification depends heavily on open communication and a forward-looking view to encourage all personnel to bring forward new risks.

Risk Analyses & Prioritization

Risk analysis consists of estimating the likelihood and the consequences of the risk and the timeframe in which action must be taken on an identified risk to avoid harm. Additionally, risks are classified and prioritized based on risk criticality, computed as the product of (likelihood of occurrence) X (consequence of occurrence).

Risk Planning

Identified risks are addressed by deciding on the appropriate handling option and developing and executing commensurate mitigation strategies.

Risk Tracking

Identified risks and the progress of mitigation actions are tracked. Periodically, risk status, trend analysis, and success of mitigation efforts are reported to the Project Management and the IFM Program Director. Feedback on both Program and Project risk activities, and emerging risks are continuously provided to the Program and Project staff and communicated to key stakeholders and customers.

Risk Control

Risk control is the feedback process of reevaluating, based on recent tracking information, what actions to take concerning a particular risk, and implementing those decisions. Actions may include changing the current action plan, closing the risk (accepting the residual risk), invoking a contingency plan when the original plan is found to be ineffective, or continuing with the original plan and continuing to track the risk.

This Risk Management Plan is the result of the risk management planning activities. It will be revisited periodically to assess for changes that might require restatement of the goals and objectives, scope, and plan. The continuous risk management process will be used continuously during a Project's lifecycle.

5.0 RISK MANAGEMENT PRINCIPLES

The IFM Program Risk Management is grounded in the following set of principles developed as a result of assessing deterrents to effective risk management and best practices employed by software projects similar to the IFM Program. These principles provide a framework to accomplish effective risk management.

- **Global Perspective**
  - View the IFM Program implementation within the context of the NASA IT Architecture.
  - Recognize both the potential value of opportunity and the potential impact of adverse effects

- **Forward-Looking View**
  - Establish upper management commitment and direction with regard to the need and importance of risk management.
  - Manage program resources and activities while anticipating uncertainties.

- **Open Communication**
  - Encourage free-flowing information at and among all program levels.
  - Enable formal and informal communication.
  - Engage independent external reviews and assessments to identify additional risks and offer informed advice
  - Track status and communicate the results of risk management activities.

- **Integrated Management**
  - Make risk management an integral and vital part of the IFM Program and Project management.
  - Adapt risk management methods and tools to a project's infrastructure and culture.
  - Develop risk-handling strategies that are commensurate with risk criticality.
  - Use measurements as early warning device
  - Formalize risk status reporting
  - Utilize bottoms-up and/or top-down risk analysis and identification techniques where applicable

- **Continuous Process**
  - Sustain constant vigilance
    - Identify and manage risks routinely through all phases of the program/project's lifecycle, including developing mitigation strategies and contingency plans
    - Evaluate risk management plan effectiveness

- **Teamwork**
  - Assign responsibilities for managing specific risks to the appropriate management level and individuals
  - Provide Continuous Risk Management training for the team
  - Communicate lessons learned between projects and between implementing Centers.

It is not possible or practicable to eliminate all risks. The costs incurred to eliminate or reduce risk must be weighed against the benefits. In most projects, Pareto's law applies: 20 percent of the individual risks represent 80 percent of the potential for project failure. Risk management also includes taking action to control risk. Reacting to identified risks starts with evaluating potential risk handling actions, including selecting a handling alternative, monitoring its implementation and continuously re-assessing its effectiveness.

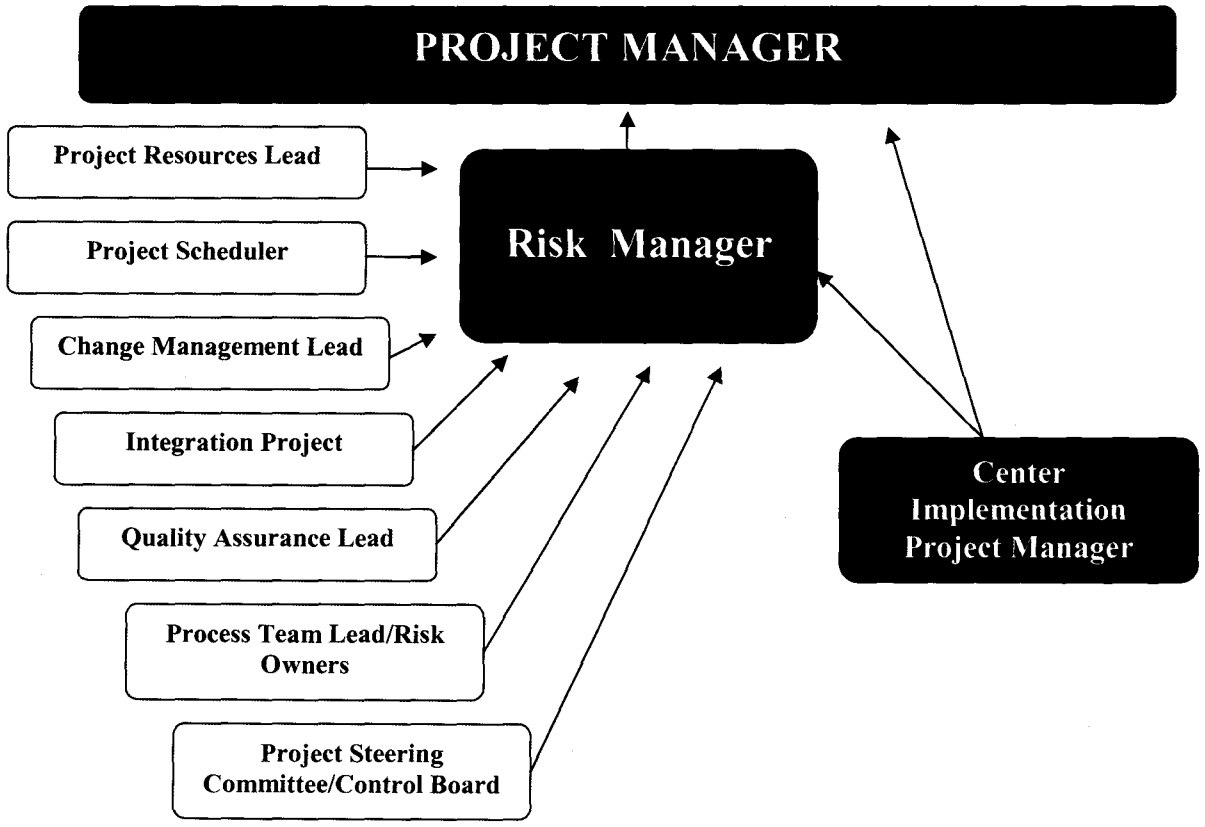
6.0 ROLES, RESPONSIBILITIES AND ORGANIZATION

ROLE	RESPONSIBILITY
Project Manager	• Oversees all Project risk management activities • Approves Risk Management Plans • Approves risk management actions • Approves Implementing Center Risk Management Plans • Oversees risk-response escalation (to Program, Center, Agency) actions • Obtains risk management training for project personnel • Reports monthly and quarterly status, trend analysis, and success of mitigation efforts of Project Office's top risks to Program Director and external entities

ROLE	RESPONSIBILITY
Risk Manager	• Actively manages all Project risk management activities • Risk management planning, risk identification, risk analysis, risk response, and risk-response evaluation • Develops and updates the Risk Management Plan and Procedures • Tracks all Project risks in a risk database • Assigns Risk Owners and assists them in developing a concise risk statement, performing risk assessment, mitigation strategies as required • Facilitates weekly Project risk reporting and status updates (i.e., during weekly staff meetings) • Works with the Project Manager to review and validate Project risks identified by staff, external reviews and assessments • Solicits and reports top five risks monthly status for the Monthly Status Report • Performs quarterly assessment of risks for the Quarterly Risk Review • Attends Quarterly Risk Review • Reports Project risks via ERASMUS as appropriate • Provides Lessons Learned • Prepares risk-related briefings for stakeholders as required • Serves as Project Risk Point of Contact • Receives and reviews reports on top risks from each Implementing Center for potential impact to Project success
Project Scheduler	• Provides early warning of schedule slippage • Communicates schedule risks to the Risk Manager • Assists the Risk Manager in responding to schedule risks
Project Resources Lead	• Provides early warning of cost overruns • Communicates cost risks to the Risk Manager • Assists the Risk Manager in responding to cost risks
Quality Assurance	• Identifies and reports quality-related risks to the Risk Manager • Assists the Risk Manager in responding to quality related risks
Change Management Lead	• Identifies and reports risks regarding the end-users' knowledge, willingness, and ability to make the changes necessary for the Project Office's success, including: - Adequate communication to stakeholders and customers - Adequate training to end-users, system administrators - Adequate documentation for users • Assists the Risk Manager in responding to related risks
Integration Project	• Identifies and reports technical risks related to the Project to the IPO Risk Manager • Assists the Risk Manager in responding to related risks
Project Steering	• Identifies and reports risks related to:

ROLE	RESPONSIBILITY
Committee/ Configuration Control Board	– Uniform configuration at all installations – Configuration change management • Assists the Risk Manager in responding to related risks • Periodically review risk status, trends and success of mitigation strategies and contingency plans for top Project risks
Risk Owner	• Develops a mitigation strategy as appropriate • Develops a contingency plan as appropriate • Obtains Project Manager approval of mitigation strategies and contingency plans • Implements approved mitigation strategies • Establishes effectiveness measures • Incorporates risk mitigation activities and milestones in the project schedule • Records mitigation actions taken • Periodically evaluates effectiveness of mitigation strategies and altering ineffective strategies • Identifies and executes continuous monitoring steps • Periodically reports status, trend analysis, and success of mitigation efforts of assigned risks to the Program Director and external entities • Documents lessons learned and potential best practices
Process Team Lead	• Identifies/track/analyzes risks at the Process Team level • Identifies risks that need to be elevated to the Project Management Team
Center Implementation Project Managers	• Manage system module Center implementation and change management risks for the Implementing Center • Develop Implementing Center's Risk Management Plan (shall be incorporated into Center Implementation Plan) • Assess risks identified by Center Implementation Team members, periodic external reviews, and assessments • Delegate responsibility for individual deployment and change management risks to members of the Center Implementation Team • Identify top Center risks for management and external status reporting • Approve risk mitigation strategies for top Center risks • Continuously monitor Implementing Center risk status, trend analysis, success of risk mitigation efforts, and contingency plans • Report monthly status, trend analysis, and success of mitigation efforts and contingency plans of Implementing Center's top risks to Project Manager and external entities

The organizational structure of the Projects' members leading the continuous risk management process is depicted below. For a detailed Risk Management Organizational Chart for a specific Project under ASIPO see Appendix A.



7.0 RISK IDENTIFICATION

Risk identification is the first step in the risk assessment process. The purpose of identification is to consider risks before they become problems/issues and to incorporate this information into the Project management process. Risk identification depends heavily upon open communication and a forward-looking view to encourage all personnel to bring forward new risks. Anyone in the Project can identify risks. The description of the risk should be clear, concise, and sufficiently informative so the risk is easily understood.

Each member of the Project team is encouraged to identify and report potential risks in their focus area. Each Team Lead will continuously project forward the logical outcomes of current

strategies, plans, and activities, exercising their expert opinion and judgment to identify new risks. Risks identification is an integral part of the weekly team member meetings.

Newly identified risks are discussed weekly at Project team meetings to determine the appropriate management strategy. The Risk Manager assigns responsibility for addressing each risk. Risks judged to be Program related or Integration Project related are referred to the Program Director or Integration Project Manager as appropriate. The Integration Project will in turn refer any Project related risks to the Project Manager.

7.1 Tools and Techniques

If risks are not identified and dealt with early they often appear later as real problems/issues that must be dealt with in a reactive sense, often with significant cost, schedule and performance consequences. The ASIPO risk management approach is to proactively identify risks, focus on critical elements, and then have effective strategies that, when implemented, manage risk on an equal footing with cost, schedule and performance. The Project will conduct risk assessment in a structured approach using one or both of the following perspectives – Top-Down Approach and Bottoms-Up Approach. Appendix B describes tools and techniques that may be used to illustrate both approaches.

8.0 RISK ANALYSIS

8.1 Risk Statement

For each risk identified the Project will write a Risk Statement. A Risk Statement is a concise description of the risk written in a condition – consequence format (this 'condition' may/might result in this 'consequence'). The condition is the key circumstance or situation that is causing a concern. The consequence is the negative outcome of the condition. There should be one condition per Risk Statement but there can be multiple consequences. The context should capture the what, when, where, how and why.

The Project will perform risk analysis that identifies the likelihood and consequences of each risk and the timeframe in which action must be taken to avoid marginal, critical, or catastrophic consequences. The risks will be tracked and monitored using a database, Lotus Notes/Methods Delivery Manager (MDM). MDM is a comprehensive toolset utilized by the ASIPO Projects to manage risks, issues, actions and implementation deliverables.

8.2 Timeframe Assessment

Risks have been analyzed and associated to a phase in each ASIPO Project that will be impacted should the risk be realized. The timeline is the time in which action must be taken to handle the analyzed risk or the time period in which the Project will be impacted by it. The timeline is depicted in the matrix below.

Near-term	The project must take action on the identified risk or will be impacted by the risk in the next 90 days.
Mid-term	The project must take action on the identified risk or will be impacted by the risk in the next 90 – 180 days.
Far-term	The project need not take action or will not be impacted by the risk in the next 180 days.

Additionally, identified Project risks are assessed to determine the likelihood of occurrence, consequence to the project if the risk does occur, and the overall criticality level for each risk (Likelihood x Consequence = Criticality).

8.3 Likelihood Assessment

Likelihood is the probability the risk will occur. Each risk will be assigned a likelihood of occurrence ranking based on the following criteria.

Rating	Likelihood of Occurrence	NPG 8000.4 Guidance
5 Very High	Event is in imminent danger of occurring and current process or approach will likely not prevent this event. Risk should be considered for transition to an issue.	Likely to occur
4 High	Event may occur and current process or approach will likely not prevent the event.	Probably will occur
3 Moderate	Event may occur but current process or approach may prevent it from occurring.	May occur
2 Low	Current process or approach is usually sufficient to prevent this type of event. The event probably will not happen.	Unlikely to occur
1 Very Low	Current process or approach is sufficient to prevent this event from occurring.	Improbable

8.4 Consequence Assessment

Consequence is the effect on the project if the risk occurs. Each risk is classified in categories: Integration/Technical, Schedule, Cost, and Mission Success. Each category has specific consequence criteria as described below. When a risk is associated with multiple risk categories, the risk's consequence in each associated category is assessed and documented (tracked). The risk category having the highest consequence level is used to compute risk criticality. In the event that "X" should occur the consequence would be:

RATING	INTEGRATION/TECHNICAL CRITERIA
5 Very High	- Program/Project will not meet minimum mission or technical success/exit criteria and no alternatives exist.
4 High	- System performance will be unsatisfactory during periods of normal operations; or - System solution will be incompatible with NASA's IT standards; or - System will be unable to satisfactorily integrate with other systems or the IFM Program modules
3 Moderate	- System will experience unsatisfactory performance degradation during peak load periods; or - Software will not support some Agency IT standards
2 Low	- System will experience noticeable, but acceptable performance degradation during peak periods; or - Software will not support some IT standards but upgrades are scheduled/expected
1 Very Low	- No system performance degradation will occur during normal operations; and - System will support IT standards

RATING	SCHEDULE CRITERIA
5 Very High	- Project performance related issues or decision-making delays will cause the project end date to be missed with significant consequence on Program commitment or loss of executive management commitment. Project commitment date cannot be met through use of schedule reserve.
4 High	- Performance related issues or decision-making delays will cause significant consequences to critical path and current project phase completion date cannot be met through use of schedule reserve. Project commitment date is not effected.
3 Moderate	- Performance related issues or decision-making delays will cause project milestones to be missed, but current project phase and Project end date are not jeopardized and can be achieved through use of schedule reserve
2 Low	- Performance related issues or decision-making delays will cause delays to individual deliverables or task completion dates, but major milestones, project phases and project end date can be achieved on time
1 Very Low	- Performance related issues or decision-making delays will not cause schedule delays that cannot be covered without use of any existing schedule reserve

RATING	COST CRITERIA
5 Very High	- Event will cause Program or Project end of year (EOY) Manager's estimate to exceed current plan by more than 15%; or - Total cost increase cannot be supported by existing Program funds; or - Negative budget event will consequence Program funding available for pending modules, causing a delay in initiating new modules and/or eliminating planned modules
4 High	- Event will cause Project Manager's EOY estimate to exceed current plan by

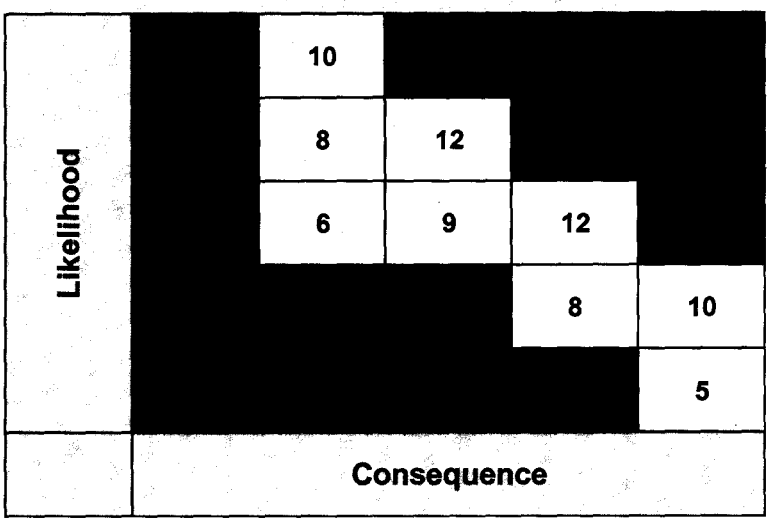
RATING	COST CRITERIA
	more than 10, but less than 15%; or - Total cost increase cannot be supported without full use of project reserves plus additional funds from Program reserves
3 Moderate	- Event can be covered by full use of available project funding reserves and project manager believes that project can be completed without requesting additional funding
2 Low	- Event consequence will be limited to task or activity and any cost overruns can be fully covered by partial use of available project reserves not to exceed 30% of remaining reserves.
1 Very Low	- Event can be resolved with minor use of project reserves (less than 5% of remaining reserves)

RATING	MISSION SUCCESS CRITERIA
5 Very High	- Major functionality will be lost and gaps cannot be closed; - Event will cause project to achieve less than 50% of functional driver benefits realization; or - System will be rejected by users and functional community
4 High	- Major functionality will be lost but gaps can be closed by using additional software bolt-ons; or - Event will cause project to achieve less than 70% of functional driver benefits realization; or - Majority of users will reject the system and significant additional transition support is required to overcome resistance
3 Moderate	- Significant functionality will be lost but gaps can be accommodated by process changes or workarounds; or - Minor additional transition support will be required to overcome user resistance; or - Benefits realization will be substantially below expectations for one functional driver
2 Low	- Functionality loss will be acceptable and any gaps will be closed using future enhancements/fixes; or - Minor user resistance will be encountered not requiring additional transition support; or - All critical functional driver benefits will be met by module
1 Very Low	- Functionality loss will be acceptable and no gap closure is necessary; and - Users will accept new system; and - All expected benefits will be achieved

8.5 Risk Criticality Ranking

The criticality for each risk is determined by the likelihood and consequences rankings (Likelihood x Consequence = Criticality). The 5 x 5 Criticality Matrix below is used to plot the likelihood and consequence, which derives at the criticality and the associated handling rules. The risk handling rules are described in Section 9.0, have been established for evaluating Project risks, and will be applied to each risk based on the criticality level.

5 x 5 Criticality Matrix



Medium	Requires Contingency Plan, may require Mitigation Plan (Management's discretion)

NOTE: If L = 2 and C = 3, criticality = 6 and is considered "Low". However, if L = 3 and C = 2, criticality still = 6 but considered "Medium".

9.0 RISK HANDLING, PLANNING, TRACKING & CONTROL

The following paragraphs describe the handling, management, tracking, and control processes applicable to Project level risks.

9.1 Risk Handling Rules

The Program has established the following risk handling rules for the associated risk criticality:

- High Criticality Risks: requires both a Mitigation Plan and a Contingency Plan
- Medium Criticality Risks: requires Contingency Plan, may require Mitigation Plan. The Project Manager may recommend a Mitigation Plan be written.
- Low Criticality Risks: no Mitigation Plan or Contingency Plan required.

NOTE: Medium risks do not require mitigation plans because the Project may choose to accept the risk. In this instance, the Project decides that it will not expend resources to mitigate the risk and takes a chance that the risk will not be realized. However, all Projects must develop contingency plans to prepare for impacts if the risk becomes an issue.

Using these options, specific risk mitigation plans should be developed and archived. Mitigation plans must balance the desire to eliminate or significantly lessen a risk's consequence with the cost effectiveness of the mitigation strategy. Metrics for evaluating the effectiveness of mitigation activities should be developed. Specific risk mitigation activities should be identified and incorporated into the Project Schedule. Best practices indicate that a sound mitigation plan should include the following components:

- The risk to be mitigated
- Selected mitigation strategies to be implemented
- When each mitigation activity will commence (e.g., what is the trigger event that moves the mitigation plan or specific activity into action)
- How and when (frequency of) the mitigation activities will be tracked (measures)
- Specific mitigation actions to be implemented
- Role or person responsible for the mitigation activities (Note: IFM roles and responsibilities indicate that the Risk Manager and Risk Owner are responsible for *managing* mitigation activities)
- Role or person responsible for tracking mitigation effectiveness (Note: IFM roles and responsibilities indicate that the Risk Manager and Risk Owner are responsible for evaluating mitigation effectiveness.)

Likewise contingency plans are invoked when a risk has been realized, realization is inevitable and near-term, or mitigation strategy success is highly unlikely. Like a mitigation plan, a trigger should be identified for activating a contingency plan. Note that IFM roles and responsibilities state that the Program Director must approve invocation of contingency plans for top Program and Project risks. Best practices indicate that a sound contingency plan should address the following:

- Description of the impending risk
- Anticipated effects on Project staff, users, stakeholders
- Anticipated effects on Project schedule
- Anticipated effects on Project budget
- Anticipated effects on work products or deliverables
- Desired outcome of contingency activities
- Communication strategy as risk becomes more likely
- What activities will be executed to minimize risk's effects
- Who is responsible for the activities (Note: IFM roles and responsibilities indicate that the Risk Manager and Risk Owner are responsible for *managing* mitigation activities)
- When will the activities occur (e.g., trigger event)
- How to evaluate and track the effect of the contingency activities (Note: IFM roles and responsibilities indicate that the Risk Manager and Risk Owner are responsible for evaluating mitigation effectiveness.)

- When the contingency activities will cease (i.e., by a certain date or when a specific desired effect has occurred).

In order to utilize best practices, Appendix C provides a Risk Detail Template, which should be included in the "attachment" field of each risk in the Lotus Notes/MDM NASA Project Management Database.

It is not possible or practicable to eliminate all risks. The costs incurred to eliminate or reduce risk must be weighted against the benefits. In most projects, Pareto's law applies: 20% of the individual risks represent 80% of the potential for project failure. Thus, a necessary part of risk planning includes estimating and allocating risk contingency reserves for Program and Project risks. A comprehensive methodology has been developed to facilitate this process. Appendix D provides detailed information about the contingency reserve allocation process.

9.2 Risk Handling Options

The focus of continuous risk management is to be forward-looking, to prevent risks from becoming problems/issues. The standard IFM Program risk handling options are:

Transfer —Reallocate the risk to others

Accept — Do not develop mitigation strategies; prepare written rationale and identify contingency plan if needed

Watch — Monitor risk attributes; establish metrics

Mitigate —Eliminate or reduce likelihood of occurrence or consequence; identify contingency plan

The risk handling rules developed in conjunction with the risk criticality determination are to be followed where applicable.

9.3 Risk Tracking & Control

The Risk Manager assigns each approved risk to the appropriate staff member or organizational entity, which is called the Risk Owner. The Risk Owner is responsible for managing the assigned risk as described in the Section 6.0 Roles, Responsibilities and Organization.

Risks will be monitored by the Risk Owner to determine the effectiveness of the mitigation strategies. Over time, the determined criticality for a mitigated risk should decline, worsen, or remain the same. Should the mitigation strategies prove ineffective in reducing risk criticality, additional or alternate mitigation strategies will be introduced. Activities associated with mitigation strategies will be incorporated into the Project schedule. Periodic management reporting against the schedule will alert the Project Manager of deviations from the mitigation strategy. Should a risk materialize into a problem/issue, the Program Director may authorize the Project Manager to invoke the contingency plan.

Risks will be tracked and managed in the Lotus Notes/MDM NASA Project Management Database. Risk-related actions are addressed weekly at the individual team member meetings, team lead meetings and Project status meetings. Additionally, the Project Office will conduct a monthly risk review meeting to monitor risk status and address monthly risk reporting. As new risks are identified the risk database will be updated. Each risk must have a risk statement (condition/consequence), mitigation statement, project phase/timeline, criticality rating, and be assigned a consequence category.

10.0 COMMUNICATIONS & REPORTING

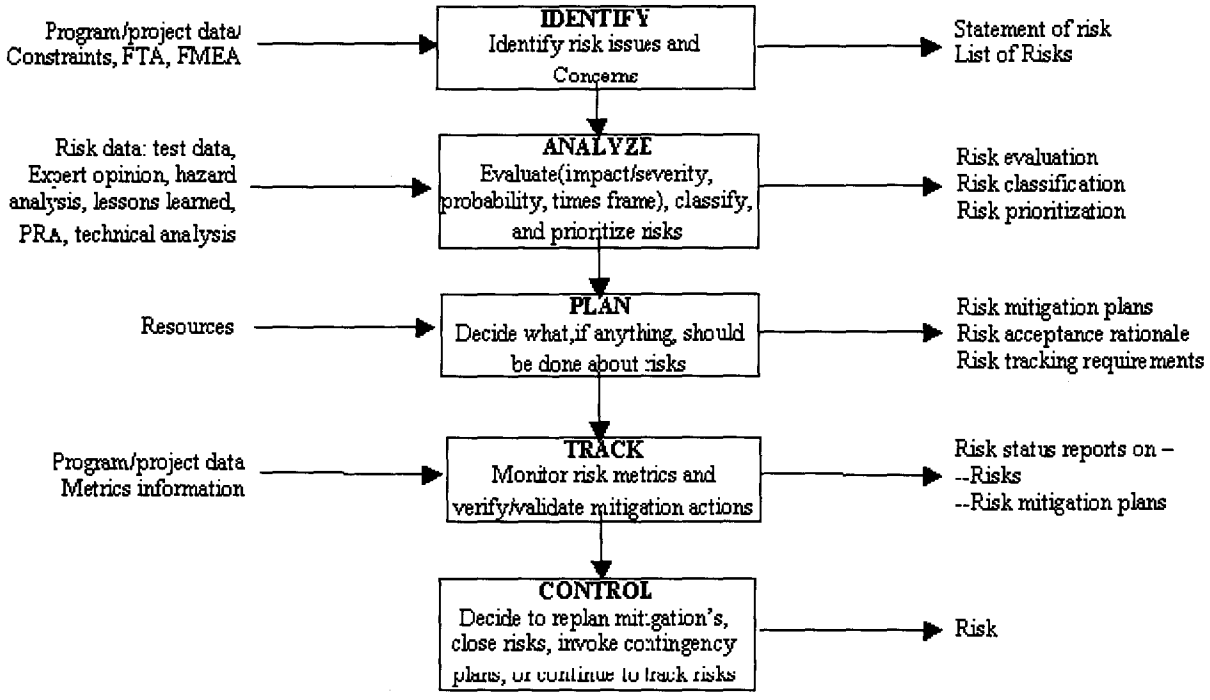
The purpose of communicating and documenting is for all personnel to understand the risks and mitigation alternatives, as well as the risk data to make effective choices within the constraints of the ASIPO Projects. Communication and documentation are critical for managing risks. The Project will adopt the Risk Communicating and Reporting Process in Appendix E recommended by the IFM Program Risk Management Framework.

Project-level risks are continuously identified, analyzed, tracked, controlled and reported by the Project Manager and staff. Independent reviews and assessments will provide an objective, external source of potential risks and recommended mitigation activities.

The Project identifies and prioritizes risks and determines the top risks, which will receive expanded management scrutiny. As part of periodic status reporting, the Project Manager will communicate the status of risk management activities to the Program Director, appropriate Steering Committee, and Implementing Center Management. Additionally, risk status reporting will be presented at the Monthly Status Review and Quarterly Program Risk Review.

10.1 Risk Management Facilitation

The Project Manager has appointed a Risk Manager to facilitate the continuous risk management process. The primary objectives of the Risk Manager are to get the process moving and keep it flowing. Specific roles are identified in the Roles, Responsibilities and Organization section of this plan. As documented in 7120.5B, the illustration below shows a continuous risk management process to be facilitated by each program/project.



Risk Management Facilitation Process

10.2 Risk Database

The Project will use the NASA Project Management database housed in Lotus Notes/MDM. The database will serve as the official risk record for the Project. The database assists the Risk Manager and Risk Owners in continuously monitoring assigned risks. The database risk record captures specific information such as the Risk Owner, responsible team, timeline, risk statement, mitigation statement, likelihood ranking, consequence ranking, criticality ranking, and the mitigation action steps taken in a given time period. Additionally, documentation will be attached (within the database) to each risk to record more detailed information related to risk planning, tracking and control activities (Risk Detail Template – Appendix C).

11.0 RISK MANAGEMENT COMMITTMENT & EFFECTIVENESS

This Risk Management Plan represents ASIPO Projects' commitment to the identification, analysis, tracking and mitigation of Project risks. The Project Manager will report risk mitigation status as part of the periodic status reporting process. The Project Manager, working in conjunction with the Implementation Contractor, will identify the top Project risks during the Formulation Phase.

Effectiveness of risk management is assessed continuously by the Project Manager and external advisors as well as oversight bodies. These resources will also assess the execution of the contingency plan when necessary.

An important component of continuous risk management is the identification of metrics to determine management commitment and the effectiveness of risk management procedures.

Performance Measures will be examined periodically, but changes will be examined at least monthly. This component will also track the whole process to evaluate its performance. Appendix F presents the Performance Measures identified.

12.0 DESCOPE APPROACH

A Project could require descoping based on the need to reduce or control cost, complexity or schedule. Each trigger should be assessed independently to determine the descope objective and resulting strategy. In the event that a Project should require descoping, the strategy to be employed would vary depending upon which phase of the Project lifecycle was in process at the time. The Risk Manager and Project Manager would evaluate the effect of the descope strategy on existing risks and identify any resulting new risks. The Project will execute the descope strategy when any of the identified triggers occur at the Project.

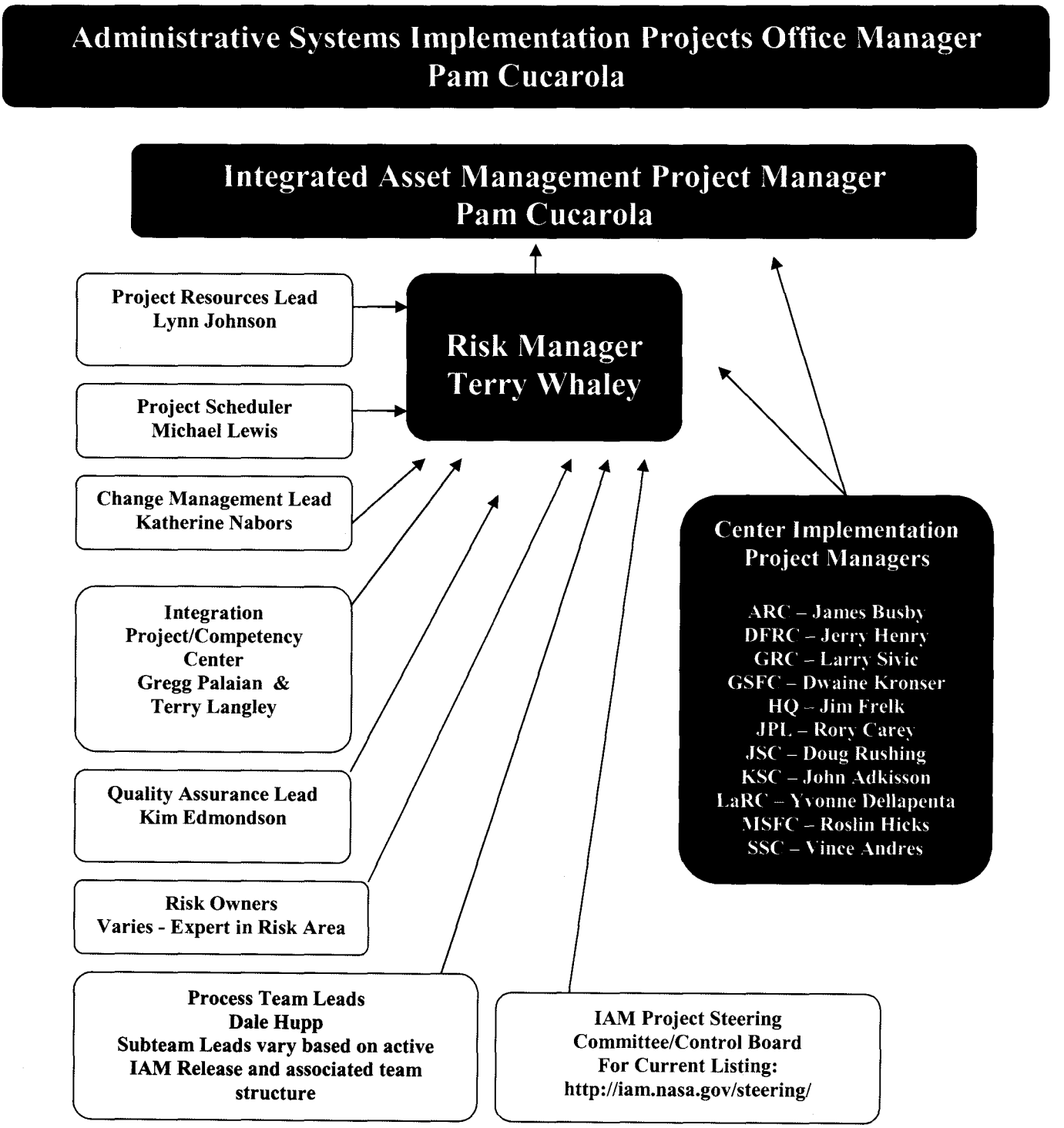
APPENDIX A: Risk Management Project Organizational Charts and Signature Pages

INTEGRATED ASSET MANAGEMENT PROJECT
SIGNATURE PAGE

APPROVAL:

Terry Whaley
Terry Whaley, Risk Manager **Date**

APPROVAL:
Pamela H. Cucarola 2/9/05
Pamela H. Cucarola, Project Manager **Date**


Administrative Systems Implementation Projects Office Manager
Pam Cucarola
Integrated Asset Management Project Manager
Pam Cucarola
Project Resources Lead
Lynn Johnson
Project Scheduler
Michael Lewis
Change Management Lead
Katherine Nabors
Integration
Project/Competency
Center
Gregg Palaian &
Terry Langley
Quality Assurance Lead
Kim Edmondson
Risk Owners
Varies - Expert in Risk Area
Process Team Leads
Dale Hupp
Subteam Leads vary based on active
IAM Release and associated team
structure
Risk Manager
Terry Whaley
Center Implementation
Project Managers
ARC – James Busby
DFRC – Jerry Henry
GRC – Larry Sivic
GSFC – Dwaine Kronser
HQ – Jim Frelk
JPL – Rory Carey
JSC – Doug Rushing
KSC – John Adkisson
LaRC – Yvonne Dellapenta
MSFC – Roslin Hicks
SSC – Vince Andres
IAM Project Steering
Committee/Control Board
For Current Listing:
http://iam.nasa.gov/steering/

CONTRACT MANAGEMENT MODULE PROJECT
SIGNATURE PAGE

APPROVAL:

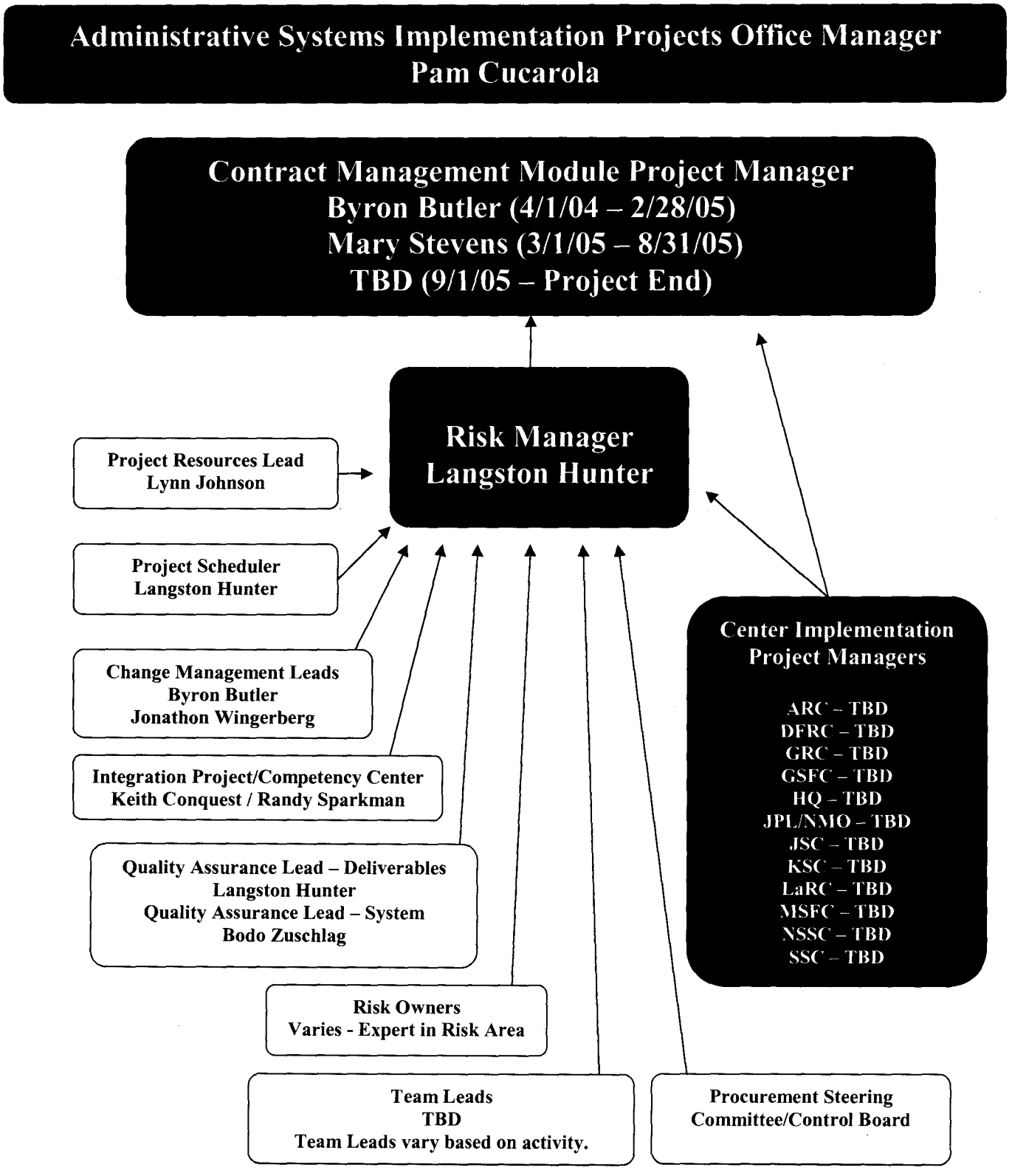
Langston Hunter 2/7/05

Langston Hunter, Booz Allen Hamilton **Date**
Risk Manager

APPROVAL:

Byron W. Butler 2/7/05

Byron Butler, Project Manager **Date**


Administrative Systems Implementation Projects Office Manager
Pam Cucarola
Contract Management Module Project Manager
Byron Butler (4/1/04 – 2/28/05)
Mary Stevens (3/1/05 – 8/31/05)
TBD (9/1/05 – Project End)
Risk Manager
Langston Hunter
Project Resources Lead
Lynn Johnson
Project Scheduler
Langston Hunter
Change Management Leads
Byron Butler
Jonathon Wingerberg
Integration Project/Competency Center
Keith Conquest / Randy Sparkman
Quality Assurance Lead – Deliverables
Langston Hunter
Quality Assurance Lead – System
Bodo Zuschlag
Risk Owners
Varies - Expert in Risk Area
Team Leads
TBD
Team Leads vary based on activity.
Procurement Steering
Committee/Control Board
Center Implementation
Project Managers
ARC – TBD
DFRC – TBD
GRC – TBD
GSFC – TBD
HQ – TBD
JPL/NMO – TBD
JSC – TBD
KSC – TBD
LaRC – TBD
MSFC – TBD
NSSC – TBD
SSC – TBD

APPENDIX B: Risk Identification/Analysis Tools and Techniques

RISK IDENTIFICATION/ANALYSIS TOOLS AND TECHNIQUES

Effective risk identification and risk assessment is the critical first step in an effective risk management program. If risks are not identified and assessed early, they often appear later as issues that must be handled in a reactive sense, often with significant cost, schedule, and performance consequences. The IFMP risk management approach proactively identifies risks, focuses on critical elements, and develops effective strategies that, when implemented, manage risk on an equal footing according to cost, schedule, technical, and performance metrics. To ensure a comprehensive assessment of potential risk, each project should be evaluated using one or both of the following perspectives:

(1) A Top-Down assessment from a mission success perspective
(2) A Bottoms-Up assessment that concentrates on the individual contributors to risk.

Under both approaches, the specific technique employed by a project can vary significantly in terms of fidelity and structure. Every effort should be made to ensure a comprehensive and formal assessment of risk. Each Project shall review the range of potential techniques for applicability, resources and time to implement, and projected benefit during the project formulation phase.

Top-Down Assessment

Description. A top-down approach should focus on mission success and identify those attributes of the project that are necessary for success. The analysis can focus on schedule events, working from success through the start of the program, or specific functions that need to be accomplished to successfully implement the project. Initially the focus is less on how an event could happen and more on identifying events that through historical perspective or logical dependency could have significant impact on the potential for success. This then provides a basis for analyzing potential root causes, likelihood, criticality, and mitigation approaches. Often, benchmarking and lessons learned are very useful tools to facilitate the analysis. Fault Tree Analysis (FTA) is a more formal approach to defining events and providing a structure for analysis of likelihood and consequences.

Lessons Learned Libraries. IFMP has established and maintains a KSS to capture and make available lessons learned and best practices regarding detailed IFMP-specific and historical lessons learned, other NASA projects of similar size, industry best practices, and best practices that are peculiar to the IFM Program. The KSS provides the capability to disseminate pertinent information to appropriate Program and Project members in a timely manner to facilitate decision-making and identify opportunities for process improvement. This KSS and the NASA Lessons Learned database can be important information resources to help identify potential risks and successful mitigation strategies.

Fault Tree Analysis Technique. FTA is a deductive technique often used in risk/reliability analysis. FTA utilizes a hierarchical representation of dependencies in a top down approach for assessing the likely causes of a failure of a high (top) level event. A model is developed that logically and graphically represents the various combinations of possible events, activities, and components that contribute to the success or failure of a high (top) event. The fault tree does not

necessarily contain all possible points of failure. The fault tree contains only those events, activities, and components whose existence contributes to the success or failure of the top event. Significant subjectivity is used to establish the hierarchy and effects. Probabilities of success or failure can be applied to each event, activity, and component. Analysis postulates a high level (top) negative event, then descends through a hierarchical model of supporting events, activities, and components, identifying the path and extent of failures that must occur in order to cause the top event to fail. FTA helps to determine:

- Requirements and functionality most critical to the success of a functional module
- Areas where resources should be focused
- Likelihood of module success based on developing success or failure of hierarchy components
- Potential effects of functionality gap on module success
- Areas of risk requiring workarounds.

Use of this technique requires significant expertise in the following areas:

- The technique itself
- Functional areas – Concept of operations, functionality requirements
- Technical areas – Testing, interfacing, Commercial off-the-shelf (COTS) functionality.

Bottoms-Up Assessment

Description. A bottoms-up approach involves the expression of the project as a detailed set of events or activities followed by the identification and mitigation of potential causes of failure. This approach is structured around the lowest elements of the project, either in a functional work breakdown structure sense or in terms of sequence of events to reach a result. Individual risks are evaluated and then aggregated to establish collective risks to determine project vulnerability. The approach presumes there is a basis for assessing risk at the component level. In hardware projects, there is often substantial statistical data on the failure rate for individual components, assemblies, and systems. This highly quantified data is often not feasible in the IFMP-type of COTS-based administrative systems. However, it is possible to provide rough estimates of risk at this level of aggregation. For example, a sub-process in the Core Financial software that has significant gaps in functionality has higher technical risk than one where the native software code fully supports the "go to" process requirements. In a similar manner, a sub-process that is fully supported by the software but represents a significant process change has a higher change management risk. In both cases, high-risk items can be identified, their contribution to project success evaluated, and mitigation strategies developed based on the assessed failure modes and root causes. Failure Mode, Cause, and Effect Analysis (FMCEA) is an example of a rigorous bottoms-up technique.

FMCEA. FMCEA is a bottoms-up inductive analysis technique used at the event, activity, or component level to define, identify, and eliminate known and/or potential failures. FMCEA lends itself to evaluating discrete events (e.g., a system test is successful or fails, a schedule

control point is achieved or missed) as opposed to making a judgment as to the level of success (e.g., how well does system functionality support a requirement).

FMCEA can be used as an early warning technique that employs a systematic approach to examining potential points of failure and associated causes and effects. Each failure mode may have multiple causes and precipitate multiple effects. Failure modes can be prioritized according to impact on system success measures, benefits, and functional drivers. FMCEA analysis can help determine:

- Discrete events or components most critical to the success of the functional module
- Obvious risk mitigation strategies
- Potential effects of event or component failure
- Areas of concern where resources should be focused.

Use of this technique requires significant expertise in the following areas:

- The technique itself
- Functional areas – Concept of operations, functionality requirements
- Technical areas – Testing, interfacing, COTS functionality

APPENDIX C: Risk Detail Template

The Risk Detail Template should be added to each risk in the "Attachment" field in Lotus Notes/MDM NASA Project Management Database. All fields should be completed and baselined when a risk is identified. However, the Mitigation Plan and Contingency Plan sections should be completed as required.

RISK DETAIL TEMPLATE

CRITICALITY HISTORY:

[Put the current status on top and maintain all criticality history
Example - 6/24/04: Baseline - Likelihood Low (1), Consequence Low (1), Criticality Low (1).]

HANDLING OPTION:

[Transfer – reallocate the risk to others
Accept – do not develop mitigation strategies; prepare written rationale and identify contingency strategy if needed
Watch – monitor risk attributes; establish metrics
Mitigate – eliminate or reduce likelihood of occurrence or consequence; identify contingency plan]

TIMEFRAME: [Phase the risk will occur: IAM Blueprint Phase, IAM All Realization Phases; IAM Realization Phase 1, IAM Realization Phase 2, IAM All Final Prep Phases, IAM Final Prep Phase 1, IAM Final Prep Phase 2, IAM All Go Live Phases, IAM Go Live Phase 1, IAM Go Live Phase 2, IAM All Phases]

DISCUSSION: [Additional context about the Risk]

MITIGATION PLAN [enter fields if required]

- **Objective:** [reduce or eliminate the risk]
- **Activity**: [list details concerning the mitigation steps]
- **Assignee**: [list person responsible for the activity]
- **Effectiveness Measures:** [List effectiveness measures. Objective measurements are preferred, but only subjective measurement may be possible. If subjective, must determine how success will be measured. Metrics may include periodic measurement of quantifiable mitigation activities, such as planned vs. actual LOE or FTE to mitigate the risk.]
- **Continuous Monitoring Steps:** [List meeting venues and reporting frequency]
- **Trigger Date/Event to Initiate Contingency Plan:** [contingency plans are invoked when a risk has been realized, realization is inevitable and near-term, or mitigation strategy success is highly unlikely]

CONTINGENCY PLAN [enter fields if required]

- **Objective:** [reduce to an identified acceptable level or eliminate the negative consequences of risk]
- **Anticipated Effects:** [list effects to staff, users, stakeholders, schedule, budget, work products/deliverables]
- **Communication Plan:** [how will staff, users and stakeholders be notified of consequences and plans? Requires coordination with Change Management Team.]
- **Activity**: [list details concerning the contingency steps]
- **Assignee**: [list person responsible for the activity]
- **Effectiveness Measures:** [List effectiveness measures. Objective measurements are preferred, but only subjective measurement may be possible. If subjective, must determine how success will be measured. Metrics may include periodic measurement of quantifiable mitigation activities, such as planned vs. actual LOE or FTE to mitigate the risk.]
- **Continuous Monitoring Steps:** [List meeting venues and reporting frequency]

EVALUATION MEASURES [Enter milestones related to the risk; meeting milestones justifies lowering the likelihood/consequence/criticality rating]

Near-Term Milestones (Less Than 90 Days)
Quarterly Evaluation Period: July – September, 2004

Date	Evaluation Measure (Milestone)	Success Factor (Expected Outcome)	Evaluation Results
MM/DD/YY			

Mid-Term Milestones (90-180 days)
Quarterly Evaluation Period: October – December, 2004

Date	Evaluation Measure (Milestone)	Success Factor (Expected Outcome)	Evaluation Results
MM/DD/YY			

Far-Term Milestones (More than 180 days)
Quarterly Evaluation Period: January – March, 2005

Date	Evaluation Measure (Milestone)	Success Factor (Expected Outcome)	Evaluation Results
MM/DD/YY			

SUCCESS FACTORS: [what constitutes a successful mitigation, what has to happen for the risk to be eliminated or reduced]

- Consequence rating will remain ____ (#).
- Likelihood rating will be reduced to Medium by meeting at least [# ___] success factors during the quarter.
- Likelihood rating will be reduced to Low by meeting at least [# ___] success factors during the quarter.

APPENDIX D: Contingency Reserves Allocation Process

CONTINGENCY RESERVES ALLOCATION PROCESS

As part of the annual budgetary process, reserves are to be calculated for the Program Office, the Integration Project Office, and each of the Module Project Offices. The reserves are risk-based; every dollar of reserves should be tied directly to the cost of occurrence of a specific risk.

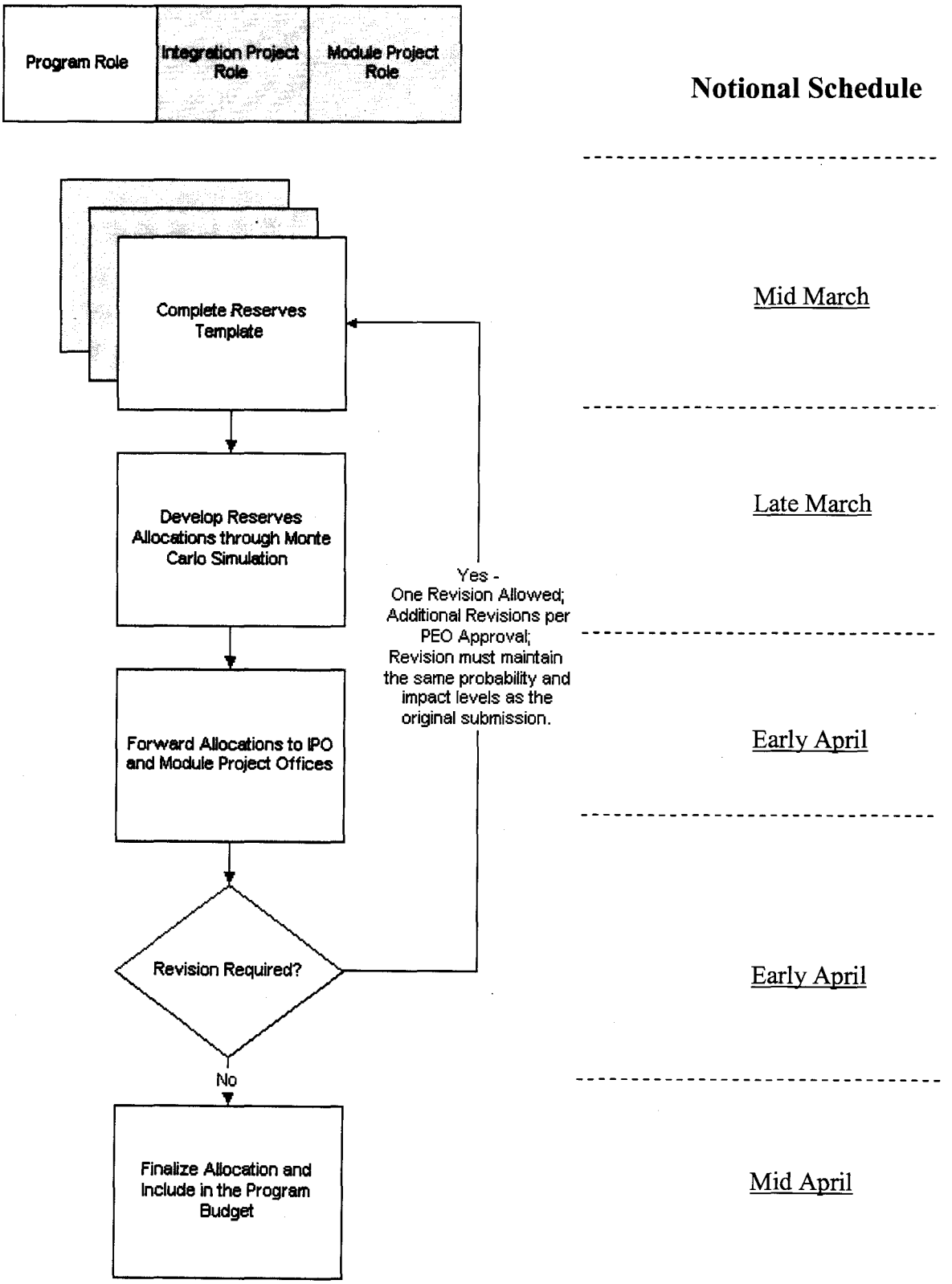
General Concept. The procedure to calculate reserves and incorporate them into the budget is a three-tiered process. The first part consists of the respective office identifying risks and allocating a reserve dollar amount to each one of the risks. A likelihood of occurrence and a level of consequence are also identified, which together determine the criticality of the risk based on the risk criticality matrix. The second step of the process is for the Program Office to collect all of the information from the various offices and to use the provided information to create frequency distributions around each of the risks. Based upon the likelihood of occurrence of each risk, confidence levels are assigned, which provide a rigorous reserve amount. In the third step the Program Office reviews the assigned reserves with each of the owners and makes any final adjustments before incorporating them into the budget. In the case that the scope or the schedule changes to the pertinent projects, this procedure must be repeated to ensure that the reserves allocation accurately reflects up-to-date risks.

Roles and Responsibilities for Contingency Reserves Allocation Process

Roles	Responsibilities
Program Office	▪ Prepare a reserves template. ▪ Use Crystal Ball® to develop Monte Carlo frequency and cumulative distributions for each risk of every submission. ▪ Send analysis of reserves to respective offices for their review and revision. ▪ Review adjusted reserves allocations and approve.
Integration Project Office, Module Project Offices	▪ Complete Program-provided reserves template. ▪ Review reserves allocations and revise, if necessary.

Reserves Process flowchart illustrates the process as well as a notional timeline of when the respective activities should be accomplished.

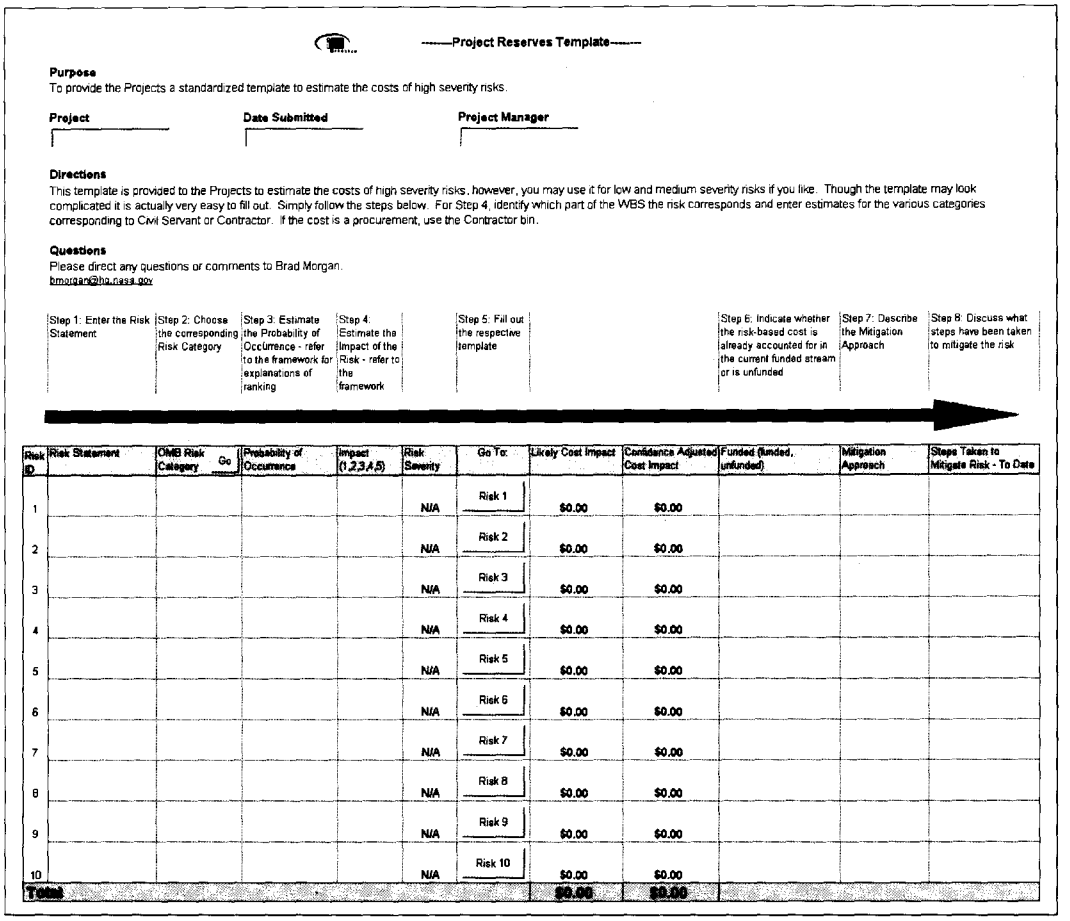
Contingency Reserves Allocation Process



To complete the reserves template follow the eight steps below, which are also summarized in the Project Reserves Template.

1. Identify all relevant risks and provide a detailed risk statement.
2. Identify the relevant OMB Risk Categories.
3. Using the Risk Analysis process outlined in this framework, select a Likelihood of Occurrence ranking (1-5). Assign a confidence level according to your selection. (See below for further explanation.)
4. Using the Risk Analysis process outlined in this framework, select a Consequence ranking (1-5).
5. Using the 'Project Reserves Template,' input level of effort (LOE), full-time equivalents (FTE), travel requirements, and software and hardware assumptions that reflect the costs of contingency for the risk, whereby:
    a. Min, Likely, and Max assumptions are required for all assumptions
    b. The assumptions are organized by WBS.
6. Identify whether the reserve is already included in the reserves budget or is not currently funded.
7. Describe the contingency approach – this should reflect the cost assumptions that were made.
8. Describe contingency and/or mitigation steps taken to date for the risk.

Project Reserves Template



------Project Reserves Template------

Purpose
To provide the Projects a standardized template to estimate the costs of high severity risks.

Project **Date Submitted** **Project Manager**

Directions
This template is provided to the Projects to estimate the costs of high severity risks, however, you may use it for low and medium severity risks if you like. Though the template may look complicated it is actually very easy to fill out. Simply follow the steps below. For Step 4, identify which part of the WBS the risk corresponds and enter estimates for the various categories corresponding to Civil Servant or Contractor. If the cost is a procurement, use the Contractor bin.

Questions
Please direct any questions or comments to Brad Morgan.
bmorgan@hq.nasa.gov

Step 1: Enter the Risk Statement	Step 2: Choose the corresponding Risk Category	Step 3: Estimate the Probability of Occurrence - refer to the framework for explanations of ranking	Step 4: Estimate the Impact of the Risk - refer to the framework	Step 5: Fill out the respective template	Step 6: Indicate whether the risk-based cost is already accounted for in the current funded stream or is unfunded	Step 7: Describe the Mitigation Approach	Step 8: Discuss what steps have been taken to mitigate the risk

Risk ID	Risk Statement	OMB Risk Category Go	Probability of Occurrence	Impact (1,2,3,4,5)	Risk Severity	Go To:	Likely Cost Impact	Confidence Adjusted Cost Impact	Funded (funded, unfunded)	Mitigation Approach	Steps Taken to Mitigate Risk - To Date
1					N/A	Risk 1	$0.00	$0.00			
2					N/A	Risk 2	$0.00	$0.00			
3					N/A	Risk 3	$0.00	$0.00			
4					N/A	Risk 4	$0.00	$0.00			
5					N/A	Risk 5	$0.00	$0.00			
6					N/A	Risk 6	$0.00	$0.00			
7					N/A	Risk 7	$0.00	$0.00			
8					N/A	Risk 8	$0.00	$0.00			
9					N/A	Risk 9	$0.00	$0.00			
10					N/A	Risk 10	$0.00	$0.00			
Total							$0.00	$0.00			

Contingency Determination and Reserve Allocation. Upon receipt of the completed template, the Program Office will run Monte Carlo simulations to establish a frequency distribution of the cost impacts. Based on the risk likelihood, each risk will be evaluated at a certain confidence level establishing the associated reserve allocation. Confidence levels will be evaluated according to information provided in the template by the Projects. For example, the template requests that the Project provide a likelihood of occurrence based on the following available rankings and associated confidence levels:

Likelihood of Occurrence Ranking	Confidence Level Range
Very Low	1% - 20%
Low	21% - 40%
Moderate	41% - 60%
High	61% - 80%
Very High	81% - 100%

The user is thus asked to choose a likelihood rating and approximate a percentage of confidence that the risk will occur. If a Project selects a likelihood of Very Low and, based on evidence asserts that there is little chance that the risk will actually occur, it can assign a confidence level of 5%. Likewise, if the Project feels that the likelihood is higher, they can assign a confidence level of 20%. This enables the Program to assign a quantifiable measurement to each likelihood rating based on risk knowledge from the Program. If this information is not provided,

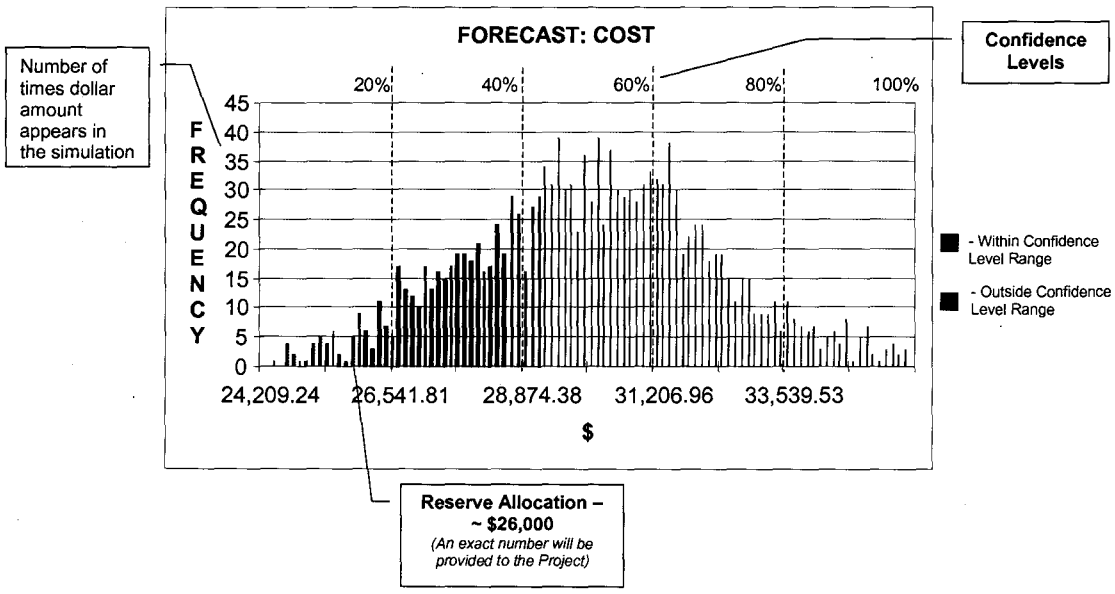
confidence levels could be assigned too conservatively or to liberally. The Program then runs the risk of allocating too little funding or excessive funding.

If a Project is unsure of the confidence level or does not provide this information in the template, the Program Budget staff will work with the Program Risk Manager to quantify risk likelihood, if possible, or default to the mid-percentage for each Confidence Level Range (i.e., 10% for Very Low, 30% for Low, 50% for Moderate, etc.).

The Program executes the Monte Carlo simulations for each risk. Resulting reserve allocations for each risk are summed to yield the total risk reserve allocation the Project. The Confidence Level outputs and resulting contingency reserve allocations will be sent to each respective Project Office for review (An example of the Confidence Level output for a Very Low Likelihood Rating (Rating = 1) and Confidence Level of 20% is shown below.

Example – Very Low Confidence Level

Very Low Likelihood of Occurrence
1%-20%



Reserve Allocation – ~ $26,000
(An exact number will be provided to the Project)

APPENDIX E: IFM Program Risk Communicating & Reporting

IFM Program Risk Communicating & Reporting

The following guidelines should be used to facilitate Program and Project Risk Communications and Reporting:

Information Sources	Information Provided	Information Recipients	Frequency of Exchange
Independent Reviews/Assessments	• Identified risks • Informed advice	• IFM Program Office • IPO • Module Projects	As identified
Testbed Simulation	Potential software and integration problems	• IPO • Module Projects	As identified
Risk Identification Tools (FTA, FMCEA, Lessons Learned)	Potential risks	• IFM Program Office • IPO • Module Projects • NASA Centers	As identified
• IFM Program Office • IPO • Module Projects • NASA Centers	Risk Status	• IFMP Steering Committee • PMC • IAR • Management	Periodic Meeting (according to existing schedules)
IFM Program Office	• Agreements • Guidance • Decisions	• IFM Program Office • IPO • Module Projects • NASA Centers	As required
• IPO • Module Projects • NASA Centers	Top 5 Project Risks and Mitigation Strategies	IFM Program Office	Monthly (via MSR briefing)

APPENDIX F: Performance Measures

ASIPO PROJECTS' PERFORMANCE MEASURES

Component	Desired Result	Performance Measure	Target	Timing/ Frequency	Data Source
Respond to Risks	Response determined for all analyzed risks	% of analyzed risks for which a response was determined % of analyzed risks for which the response was accepted	100% 85%	Once initially, then at each tracking iteration	Project Risk Management
	Plans developed for controlled risks	% of risk mitigation or contingency plans completed % of risk mitigation or contingency plans approved	100% 85%	Monthly evaluation	
	Plans implemented	% plans implemented	According to plan but 100% before impact	Monthly evaluation	
Evaluate Response Effectiveness	Responses evaluated for effectiveness	% of responses evaluated for timeliness % of responses evaluated for meeting objectives	100% 95 %	At plan completion	Project Risk Management
Document, Track, and Communicate the Risk Management	Plans documented and communicated	% of plans documented % of plans communicated	100% 95 %	At plan completion	Project Risk Management
	Risks identified documented	% risks documented (from those identified)	100%	Risk database	
	Plans are executed and implemented	% of total decisions/actions taken by deadline dates % deviation of actual from planned implementation completion dates	95% < 5 %	Monthly evaluation	
	Risks with non-effective responses are revisited	% of risks with non-effective responses re-analyzed and going through another iteration	100%	Monthly evaluation	